

## APPENDIX S: LANDSCAPE SCALE MITIGATION

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## **APPENDIX S—LANDSCAPE SCALE MITIGATION**

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### Introduction

The EIS analyzed the effects of the project's proposed 8,950 infill natural gas wells and field development within a project area consisting of approximately 1.1 million acres. The locations of the proposed wells have not been identified at this time. The BLM will review and authorize each component of the project that involves the disturbance of federal lands on a site-specific basis. Surface-disturbing activities are generally authorized by the BLM through the approval of an Application for Permit to Drill (APD), right-of-way grant, and/or Sundry Notice, with supporting environmental analysis in accordance with the NEPA process. Evaluations at this level include site-specific analyses of proposed construction, including well locations, pipelines, access roads, and other facilities associated with natural gas development. These analyses would be tiered to the broad-scale level analysis included in this EIS and would be completed prior to the authorization of any construction.

This appendix has been developed as a mitigation plan for the CD-C project area, and identifies opportunities to apply landscape-scale mitigation in order to address reasonably foreseeable impacts, identified in the EIS NEPA analysis, that may occur as a result of the development.

This appendix summarizes impacted resources, the avoidance and minimization mitigation measures to address those impacts, and remaining reasonably foreseeable residual impacts to those resources after the mitigation measures are applied, based on the analysis in the CD-C EIS. Residual impacts are those impacts that remain after all appropriate BMPs, COAs, RDFs have been implemented; they can also be referred to as unavoidable impacts. This appendix identifies those resources that were determined to have residual impacts that warrant compensatory mitigation. It outlines how the BLM would include avoidance, minimization, rectification, reduction/elimination (some of which were already identified in Chapter 4 of the CD-C EIS), and compensatory mitigation (for those resources that were determined to have residual impacts that warrant compensatory mitigation) for future actions that tier to this EIS. These actions will have site-specific NEPA analysis completed that will include the necessary mitigation measures, in accordance with this appendix. Finally, this appendix identifies example opportunities for implementing compensatory mitigation.

Based on the summarization of the NEPA analysis within the EIS and identification of reasonably foreseeable residual impacts that warrant compensatory mitigation, this appendix contains a mitigation strategy to address reasonably foreseeable residual impacts to pronghorn antelope, mule deer, and Greater Sage-Grouse for the CD-C project. Through the Rawlins Resource Management Plan (RMP) (BLM 2008) and the Wyoming Approved Resource Management Plan Amendments for Greater Sage-Grouse (ARMPA) (BLM 2015), areas for avoidance of impacts to these species were identified. Additionally, the RMP, ARMPA, and this EIS contain measures appropriate for minimizing the impacts to these species associated with this type of development.

During analysis of actions that tier to this EIS, the BLM will identify, analyze and require compensatory mitigation to address the reasonably foreseeable impacts to these resources that remain and/or when certain circumstances (e.g. valid existing rights, lack of technologic capabilities) make it impossible to avoid/minimize the impacts to these species' habitats and, therefore, require replacement or substitute resources or environments for these species. The need for compensatory mitigation will be based on applicable mitigation standards and what is appropriate and commensurate with the reasonably foreseeable residual effects. The Rawlins RMP indicates a no net loss mitigation standard for antelope and mule deer. The Wyoming ARMPA identifies a net conservation gain mitigation standard within PHMA and the Rawlins RMP indicates a no net loss within GHMA for Greater Sage-Grouse.

In the event, in the site-specific EA and/or other APD-level analysis, residual impacts to pronghorn antelope, mule deer, or Greater Sage-Grouse are identified, the BLM will:

1. Describe the residual effects.
2. Calculate the compensatory mitigation obligation associated with the residual effects.

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- a. Determine the base amount of compensatory mitigation (debits). (Section F.2 of this Appendix)
  - b. Adjust the amount of compensatory mitigation (debits) with consideration to risk or other relevant factors as determined by the authorized officer.
  - c. Describe the potential type of compensatory mitigation appropriate for mitigating the residual impacts, including each of the mitigation measures and their required outcome.
  - d. Determine the site(s) of the compensatory mitigation measures that will provide for the appropriate types and amount of compensatory mitigation measures (commensurate with the debit), and achieve the maximum benefit toward the mitigation standard to the impacted resources within the context or the conditions and trends of those resources, at all relevant scales.
    - i. Additional adjustments to the amount of compensatory mitigation may be necessary to account for issues related to the compensatory mitigation measures and sites, such as differences between the quality of resources at the impacted site and those expected to be produced at the compensatory mitigation site, any lack of timeliness, the degree of durability of the compensatory mitigation site, and the type of compensatory mitigation.
  - e. If NEPA analysis has not already been completed, analyze the compensatory mitigation measures, sites and mechanisms necessary to meet the compensatory mitigation obligation, including length of durability and monitoring and reporting requirements.
  - f. Determine the compensatory mitigation mechanism(s). The BLM should discuss the compensatory mitigation mechanism options (choosing from the list of potential compensatory mitigation projects identified in the process described in **Section G** of this Appendix) with the land use authorization's applicant. The BLM will determine the mechanism(s), taking into account the preferences of the applicant.
  - g. Identify the required outcomes and responsible parties for each mitigation measure, site, and/or mechanism. The BLM may need to ensure that the proponent provides the BLM with an adequate performance bond or similar financial instrument. The BLM will include any costs for implementation and effectiveness monitoring and other applicable administration of the chosen mitigation measures.
3. In the decision document, the BLM will approve, deny, or approve with the additional mitigation (8.b) the proposed land use activity.
    - a. If approving the land use activity, the BLM will clearly identify in the decision document(s) the required mitigation measures (i.e. mitigation obligation) with rationale from and reference to the associated NEPA analysis.
    - b. The BLM must incorporate any mitigation obligations from the decision document(s) into the land use authorization via stipulations, terms and conditions, conditions of approval, etc., so that they become requirements of the land use authorization.

This approach is consistent with Secretarial Order No. 3330, *Improving Mitigation Policies and Practices of the Department of the Interior*, and the BLM's obligations under FLPMA, National Environmental Policy Act (NEPA) of 1969, Mineral Leasing Act of 1920, as amended, Council on Environmental Quality (CEQ) Regulations, and WO IM 2013-142: Interim Policy, Draft – Regional Mitigation Manual Section – 1794.

This appendix includes the following elements (A, B, C, and D provide summary information from the CD-C EIS, the Rawlins Field Office Resource Management Plan (RMP) and other relevant documents and policies):

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- A. Affected Resources:** A description of the land use activities expected in the geographic area of the EIS and the resources that may be reasonably foreseeably impacted by those land use activities.
- B. Management Goals and Objectives:** A description of the relevant management goals and objectives (e.g. BLM's land use plan objectives, a State agency's resource objectives, etc.) for these resources, at all relevant scales.
- C. Baseline Conditions and Trends:** A description of baseline conditions and trends of these resources, at all relevant scales, including how the conditions and trends are expected to change due to the reasonably foreseeable impacts.
- D. Mitigation Measures:** A description of mitigation measures to avoid, minimize, rectify, and/or reduce/eliminate over time the reasonably foreseeable impacts to these resources.
- E. Residual Effects:** A description of the reasonably foreseeable residual effects to these resources, including the identification of which of these residual effects may warrant compensatory mitigation.
- F. Compensatory Mitigation Measures and Defined Outcomes:** An evaluation and prioritization of appropriate compensatory mitigation measures for the resources that warrant compensatory mitigation, including clearly-defined and measurable outcomes.
- G. Draft CD-C Compensatory Mitigation Measures and Sites List:** An evaluation and prioritization of compensatory mitigation sites that will maximize the benefit for the resources that may warrant compensation, including considerations of each site's ability to provide benefits to multiple resources, importance in the geographic area, durability, and additionality.
- H. Durability and Monitoring of Mitigation:** A description of actions necessary to achieve durability of, and to monitor, adapt (if necessary), and report on, mitigation.

### A. Affected Resources

The Continental Divide-Creston (CD-C) Natural Gas Development Project and other land use activities expected in the geographic area are described in Chapter 3 of the Continental Divide-Creston Natural Gas Development Project Final EIS. The resources listed below are those that were determined through the EIS process to be reasonably foreseeably impacted. These resources are described under four categories: physical, biological, human, and management environments.

- **Physical Environment**

Geology, Paleontologic Resources, Soils, Water Resources, Air Quality

- **Biological Environment**

Vegetation, Invasive, Non-native Plant Species, Wildlife, Special Status Species and Wild Horses

- **Human Environment**

Visual Resources, Recreation, Lands with Wilderness Characteristics, Cultural and Historical Resources, Socioeconomics, Transportation and Access, Noise

- **Management Environment**

Range Resources, Oil and Gas and other Minerals, Health and Safety, Waste and Hazardous Materials Management

### B. Management Goals and Objectives

A description of the relevant management goals and objectives for these resources, at all relevant scales, is provided in the following locations:

- **Physical Environment**

- Geology: RMP Section 2.3.16 Water Quality, Watershed, and Soils Management
- Paleontologic Resources: RMP Section 2.3.9 Paleontology
- Soils: RMP Section 2.3.16 Water Quality, Watershed, and Soils Management
- Water Resources: RMP Section 2.3.16 Water Quality, Watershed, and Soils Management
- Air Quality: RMP Section 2.3.1 Air Quality

- **Biological Environment**

- Vegetation: RMP Section 2.3.14 Vegetation
- Invasive Non-native Plant Species: RMP Section 2.3.14 Vegetation
- Wildlife: RMP Section 2.3.18 Wildlife and Fisheries
- Special Status Species: RMP Sections 2.3.14 Vegetation; 2.3.18 Wildlife and Fisheries
- Wild Horses: RMP Section 2.3.17 Wild Horses

- **Human Environment**

- Visual Resources: RMP FEIS No Action Alternative, Visual Resource Management
- Recreation: RMP Sections 2.3.8 Off-Highway Vehicles; 2.3.10 Recreation and Visitor Services
- Lands with Wilderness Characteristics: BLM Manual Sections 6310 and 6320
- Cultural and Historical Resources: RMP Section 2.3.2 Cultural Resources
- Socioeconomics: RMP Sections 2.3.11 Socioeconomics

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- Transportation and Access: RMP Sections 2.3.13 Transportation and Access Management; 2.3.8 Off-Highway Vehicles
- Noise: Rawlins RMP APPENDIX 15 - Best Management Practices For Reducing Surface Disturbance And Disruptive Activities
- **Management Environment**
  - Range Resources: RMP Section 2.3.6 Livestock Grazing,
  - Oil and Gas and other Minerals: RMP Section 2.3.7 Minerals
  - Health and Safety: RMP Sections 2.3.8 Off-Highway Vehicles; 2.3.7 Minerals
  - Waste and Hazardous Materials Management: RMP Section 2.3.7 Minerals

### C. Baseline Conditions and Trends

A description of baseline conditions and trends (including consideration of change agents) of these resources, at all relevant scales, including how the conditions and trends are expected to change due to the reasonably foreseeable impacts is provided within this EIS in the following locations:

- **Physical Environment**
  - Geology: CD-C EIS Sections 3.1 and 4.1
  - Paleontologic Resources: CD-C EIS Sections 3.2 and 4.2
  - Soils: CD-C EIS Sections 3.3 and 4.3
  - Water Resources: CD-C EIS Sections 3.4 and 4.4
  - Air Quality: CD-C EIS Sections 3.5 and 4.5
- **Biological Environment**
  - Vegetation: CD-C EIS Sections 3.6 and 4.6
  - Invasive, Non-native Plant Species: CD-C EIS Sections 3.7 and 4.7
  - Wildlife: CD-C EIS Sections 3.8 and 4.8
  - Special Status Species: CD-C EIS Sections 3.9 and 4.9
  - Wild Horses: CD-C EIS Sections 3.10 and 4.10
- **Human Environment**
  - Visual Resources: CD-C EIS Sections 3.11 and 4.11
  - Recreation: CD-C EIS Sections 3.12 and 4.12
  - Lands with Wilderness Characteristics: CD-C EIS Sections 3.13 and 4.13
  - Cultural and Historical Resources: CD-C EIS Sections 3.14 and 4.14
  - Socioeconomics: CD-C EIS Sections 3.15 and 4.15
  - Transportation and Access: CD-C EIS Sections 3.16 and 4.16
  - Noise: CD-C EIS Sections 3.17 and 4.17
- **Management Environment**
  - Range Resources: CD-C EIS Sections 3.18 and 4.18
  - Oil and Gas and other Minerals: CD-C EIS Sections 3.19 and 4.19
  - Health and Safety: CD-C EIS Sections 3.20 and 4.20
  - Waste and Hazardous Materials Management: CD-C EIS Sections 3.21 and 4.21

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Biological and physical components are often used as indicators of the functional status of ecological process and site integrity (Pellant et al. 2005). The assessment of three attributes (soil/site stability, hydrologic function, and biotic integrity) produces a qualitative assessment used by the BLM when evaluating rangeland health. These attributes are defined below:

- **Soil/Site Stability:** The capacity of an area to limit redistribution and loss of soil resources (including nutrients and organic matter) by wind and water.
- **Hydrologic Function:** The capacity of an area to capture, store, and safely release water from rainfall, run-on, and snowmelt (where relevant), to resist a reduction in this capacity, and to recover this capacity when a reduction does occur.
- **Biotic Integrity:** The capacity of the biotic community to support ecological processes within the normal range of variability expected for the site, to resist a loss in the capacity to support these processes, and to recover this capacity when losses do occur. The biotic community includes plants, animals, and microorganisms occurring both above and below ground.

There are key quantitative and qualitative assessment indicators used for the determination of each attribute (please see Pellant et al. 2005 for a complete discussion of these indicators).

The BLM and the Natural Resources Conservation Service (NRCS) have been working together to collect indicators of rangeland health data consistent with the national Assessment, Inventory, and Monitoring (AIM) framework/strategy (Toevs et al. 2011) in order to provide landscape level information that field and district offices can use in making land use decisions. The sampling framework is unbiased and statistically valid which will allow data collected at specific sites to be scaled to larger management units, watersheds, or landscapes otherwise identified and will allow locally collected data to be combined with regional (or national) level data for use at larger scales (Taylor et al. 2014). Through the Landscape Monitoring Framework (LMF), additional points are captured each year, both inside and outside of the CD-C project area, thereby making it possible to compare trends inside and outside of the CD-C project area to help inform whether resources are being unintentionally impacted as a result of the project.

Twenty-nine data points that fall within the CD-C project area have been monitored since 2011 as part of the BLM's Westside LMF and will provide the Rawlins Field Office (RFO) with baseline information for determining appropriate compensatory mitigation actions based on project location. These data and other local knowledge, such as that gathered through rangeland standards and guidelines assessments, will provide baseline information and form a component of the NEPA analysis that will be completed for an individual project. As APDs are received by the RFO, these data points, additional data points, and land health assessments can be utilized for the proposed project area to help inform baseline conditions for the project location. Data have also been collected adjacent to areas identified, in **Section H**, as potential landscape mitigation measure sites.

The RFO will consider the LMF monitoring data for the APD and/or associated infrastructure causing the residual impacts warranting compensatory mitigation. The baseline information and the value of the habitat in the proposed project area will help determine the amount of compensatory mitigation (i.e. to inform "q" in the equation in **Section F** of this appendix) and aid in the identification of compensatory mitigation sites with habitat value equal-to or higher-than the disturbance area as determined by the monitoring data points within these sites (i.e. to help ensure that the mitigation standard set for resources in **Section E** of this Appendix is met).

### D. Mitigation Measures

Below is a description of where mitigation measures to avoid, minimize, rectify, and/or reduce/eliminate over time the reasonably foreseeable impacts to these resources as analyzed within the CD-C EIS may be found.



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Appendix C “Conservation and Mitigation Measures” in the CD-C EIS describes Best Management Practices (BMPs), Conditions of Approval (COAs), terms and conditions, and Required Design features (RDFs) that may be applied to each APD and/or ROW grant as necessary. Also included in Appendix C is a reference to the Rawlins RMP BMPs (2008). Additional mitigation measure will be applied to authorizations that tier to this EIS, based on current law, regulation, and/or policy.

Additional mitigation measures within the CD-C EIS are listed below.

### ▪ **Physical Environment**

- **Geology:** No additional mitigation measures were identified.
- **Paleontologic Resources:** Mitigation measures are described in Appendix C, in Appendix D “Paleontological Resources Program Guidance,” the Paleontological Resource Preservation Act (PRPA), and BLM IM No. 2009-011 “Assessment and Mitigation of Potential Impacts to Paleontological Resources” (BLM 2008d).
- **Soils:** Additional mitigation measures would be required on a site-specific basis to minimize adverse impacts, and would include closed-loop drilling, immediate stabilization and other measures as necessary.
- **Water Resources:** No additional mitigation measures were identified.
- **Air Quality:** Additional mitigation of predicted air quality impacts could be implemented by the following control measures:
  - Use of Tier 4 or equivalent drill rig engines, reducing nitrous oxides, carbon monoxide, PM<sub>10</sub>, PM<sub>2.5</sub>, and volatile organic compound (VOC) emissions.
  - Use of Tier 2 or better construction equipment, reducing nitrous oxides, carbon monoxide, PM<sub>10</sub>, PM<sub>2.5</sub>, and VOC emissions.
  - Application of chemical suppressant on unpaved roads and additional watering during construction activities to minimize fugitive dust, reducing particulate (PM<sub>10</sub>, PM<sub>2.5</sub>) impacts.
  - Centralization of well pad production facilities (e.g., heaters, flares, dehydration units) and installation of liquids-gathering systems, reducing NO<sub>x</sub>, CO, PM<sub>10</sub>, PM<sub>2.5</sub>, VOC, and HAP emissions and reducing truck traffic.
  - Field electrification, reducing nitrous oxides, carbon monoxide, PM<sub>10</sub>, PM<sub>2.5</sub>, and VOC emissions. These and other mitigation options or control measures may already be in practice in the CD-C project area to varying degrees.

### ▪ **Biological Environment**

- **Vegetation:** Mitigation measures are described in Appendices C, D, M, and P of the CD-C EIS.
- **Invasive, Non-native Plant Species:** Mitigation measures are described in Appendices C, D, and M of the CD-C EIS.
- **Wildlife:** Mitigation measures are described Appendices B, C, I, N, and P. The following additional measures were included in the CD-C EIS and could further minimize impacts:
  - Minimizing human presence at well sites after they have been put into production by remote monitoring of project facilities and gating of roads;
  - Development planning for an entire lease or several leases;
  - Noise-reduction technology, such as hospital grade mufflers, sound walls or soundproof buildings, or noise-reducing techniques for cooling fans;
  - Monitoring of migration corridors to determine which fences restrict movement and modify fences to reduce impacts to migrating big game species;

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- Habitat improvement projects such as water developments and vegetation treatments; and
- Training programs for field workers to raise their awareness of activities that cause stress to big game, times of day when collisions are most likely, and other programs as necessary.

### Big Game Crucial Winter Range

Habitat and species protection measures for big game are identified in the Rawlins RMP (BLM 2008). These protection measures are identified to reduce impacts to big game species within the CD-C project area (page 2-53 to 2-54, items 14–16). In addition, a portion of the Upper Muddy Creek/Grizzly Wildlife Habitat Management Area occurs within the CD-C project area (Rawlins RMP, page 2-41) which affords additional protection measures for elk and mule deer crucial winter range. Coordination with the WGFD will allow the Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats management actions to be implemented to reduce impacts to big game species. Crucial ranges are identified by Wyoming Game and Fish Department (<https://wgfd.wyo.gov/Wildlife-in-Wyoming/Geospatial-Data/Big-Game-GIS-Data>).

### Big Game Migration Corridors

Big game migration corridor habitat protection measures are identified in the Rawlins RMP (pages 2-53 to 2-54, items 17–18). No big game migration corridors have been formally designated within the CD-C project area.

### Mule Deer and Pronghorn Antelope Protection Measures

The conservation measures below provide the framework for avoiding and minimizing impacts to mule deer and pronghorn antelope. These measures will be used to assess the need for and amount of compensatory mitigation (see **Section E** and **Section F.1**).

- Surface-disturbing and disruptive activities within big game crucial winter range are prohibited during the period of November 15 to April 30.

Application of additional mitigation measures such as those listed below as well as a dust control plan (Appendix P) as required for transportation planning (Appendix N), could also work toward reducing the impacts to all wildlife species:

- Minimizing human presence at well sites after they have been put into production by remote monitoring of project facilities and gating of roads
- Development planning for an entire lease or several leases
- Noise-reduction technology, such as hospital grade mufflers, sound walls or soundproof buildings, or noise-reducing techniques for cooling fans
- Monitoring of migration corridors to determine which fences restrict movement and fences modified to reduce impacts to migrating big game species
- Habitat improvement projects such as water developments and vegetation treatments
- Training programs for field workers to raise their awareness of activities that cause stress to big game, times of day when collisions are most likely, and other programs as necessary
- **Special Status Species:** Mitigation measures are described in Appendices B, C, I, N and P of the CD-C EIS. Additional mitigation measures whose general application would benefit numerous Special Status Species include the following:
  - Minimizing human presence at well sites after they have been put into production by remote monitoring of project facilities and gating of roads;
  - Development of travel management plans;

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- Utilization of noise-reduction techniques;
- Training programs for field workers to raise their awareness of activities that cause stress to wildlife, times of day when collisions are most likely; and
- Installation of devices to preclude raptor-perching near prairie-dog towns and pygmy rabbit burrows.
- Application of the BMPs found in Appendix 15 of the Rawlins RMP ROD

Projects located within the Wyoming Priority Habitat Management Areas (PHMA) identified in the ARMPA have additional protection measures attached to reduce and/or remove potential impacts to Greater Sage-Grouse. The underlying construct of the ARMPA and the Wyoming Core Area Strategy (Executive Order 2015-4) for Greater Sage-Grouse is the recognition that Core Areas represent landscapes of high value to the species relative to non-Core Areas. Likewise, within Core Areas, some locations are more ecologically important or “valuable” than others for protecting and sustaining the species. The conservation measures that are part of the Core Area Strategy are included to ensure that the impacts of certain activities are avoided and/or minimized within Core Areas.

### Greater Sage-Grouse Conservation Measures

The conservation measures below provide the framework for avoiding and minimizing impacts to Greater Sage-Grouse. The measures will be used to assess the need for and amount of compensatory mitigation (see **Section E** and **Section F**).

- Outside Core Areas, surface disturbing and/or disruptive activities are prohibited from April 1 – July 15 to protect Sage-Grouse nesting and early brood-rearing habitats within 2 miles of the perimeter of occupied leks.
- Inside Core Areas, surface disturbing and/or disruptive activities are prohibited from April 1 – July 15 to protect Sage-Grouse nesting and early brood-rearing habitats.
- Surface disturbing and/or disruptive activities in mapped winter concentration areas are prohibited from December 1 – April 14 to protect Core Area populations of Sage-Grouse that use these winter concentration habitats.
- Inside Core Areas, the density of disturbance of an energy or mining facility is limited to an average of one site per square mile (640 acres) within the area defined by the DDCT, subject to valid existing rights.
- Inside Core Areas, cumulative disturbance within suitable habitats will not exceed 5 percent of the total suitable habitat within the area defined by the DDCT.
- Inside Core Areas, new roads that will have relatively high levels of activity (accessing multiple wells, haul roads, housing development) will be avoided within 1.9 miles of the perimeter of occupied Sage-Grouse leks.
- Outside Core Areas, surface occupancy and surface disturbing activities are prohibited within 0.25 mile of any occupied Sage-Grouse lek.
- Inside of Core Areas, surface occupancy and surface disturbing activities are prohibited within 0.6 mile of any occupied Sage-Grouse lek.
- Wild Horses: The Operators could enhance wild horse welfare by addressing the importance of the Wild Free-Roaming Horse and Burro Act of 1971 (Public Law 92-195) at all new-employee orientations.

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### ▪ Human Environment

- Visual Resources: Mitigation measures are described in Appendix C of the CD-C EIS.
- Recreation Mitigation measures are described in Appendix C of the CD-C EIS.
- Lands with Wilderness Characteristics Mitigation measures are described in Appendix C of the CD-C EIS.
- Cultural and Historical Resources CD-C EIS Mitigation measures are described in Appendices C and J of the CD-C EIS. The following additional minimization measures would apply to development activities that affect Historic Properties for which setting is an Aspect of Integrity:
  - Construct roads in minimally visible areas.
  - Relocate project or hide disturbance.
  - Use matting on rights-of-way during construction to minimize surface disturbance and visibility.
  - Allow no surface disturbance within a quarter-mile or the visual horizon, whichever is closer, of contributing segments of historic trails or trail-associated sites.
  - Limit trail crossings to existing disturbance corridors or non-contributing segments, unless otherwise determined by BLM in consultation with the SHPO.
  - An additional BMP that may serve to minimize visual impacts to the setting of Historic Properties is the use of low-profile tanks.
- Socioeconomics: Section 4.15.3 Other Planning Documents of the CD-C EIS. The following mitigation measures should be implemented to reduce adverse socioeconomic effects and enhance the beneficial effects:
  - To the extent practicable, the Operators should attempt to hire and train local workers from Carbon and Sweetwater counties.
  - The Operators should acquire and require their contractors, to the extent practicable, to acquire Carbon and Sweetwater County sales and use tax licenses and purchase all materials, equipment, and supplies to be used within the project area under these licenses so that proper attribution of sales and use tax payments can occur.
  - The Operators and their major contractors should ensure that adequate temporary housing resources are available to accommodate their temporary drilling, field-development, and ancillary facility construction workforces.
  - In order to allow local governments to effectively plan for the needed infrastructure and services to accommodate the workforce and population associated with this major development initiative, the Operators should meet annually with the BLM and representatives of local and state governments to discuss near-term and mid-term development plans. If events that would substantially accelerate or retard development in the project area become evident, the Operators should meet with the BLM and representatives of local and state governments to discuss the potential effects of such events.
- Transportation and Access: Mitigation measures are described in Appendix C of the CD-C EIS.
- Noise: Mitigation measures are described in Appendix C of the CD-C EIS.

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### ▪ Management Environment

- Range Resources: Mitigation measures found in Appendices C and E of the CD-C EIS. The addition of the following measures not found in Appendix C would further minimize impacts to the range:
  - Heavy equipment exceeding the recommended gross vehicle weight would not be allowed to use cattle guard crossings.
  - All gates within the project area would be left as they are found (i.e., open gates would be left open, closed gates would be closed).
  - The Operators could coordinate with affected livestock operators to minimize disruption during livestock operations, including lambing/calving season.
  - The BLM could require that off-road activity be minimized.
  - The BLM could require that no vehicle activity be allowed on recently reclaimed sites (including pipeline rights-of-way), wetland areas, or other sensitive sites.
  - Sites undergoing reclamation could be signed at all possible entry sites, especially gathering pipelines that connect several well pads. Signs should state “Authorized Vehicles Only” to allow maintenance work on valves, for example, by responsible Operators.
- Oil and Gas and other Minerals: No additional mitigation measures were identified.
- Health and Safety Mitigation: Mitigation measures found in Appendix C of the CD-C EIS. The addition of the following measures found in the CD-C EIS would further minimize impacts:
  - Cooperatively permit and operate in-field liquids-gathering pipelines and road systems
  - Waste and Hazardous Materials Mitigation measures found in Appendix C of the CD-C EIS
  - Cooperatively permit and operate in-field disposal facilities for solid waste, produced water, drilling mud, and other activities.

### E. Residual Effects

The following is a description of the reasonably foreseeable residual effects to resources where they occur, including the identification of which of these residual effects may warrant compensatory mitigation.

#### E1. Resources with reasonably foreseeable residual effects not warranting compensatory mitigation

- Air Quality  
The reduction in emissions brought about by application of any of these measures could be estimated with additional modeling based on more detailed descriptions of the actual drilling and production processes used by the Operators. However, additional and more detailed information related to those practices would be needed from the Operators. Mitigation measures determined to be necessary to demonstrate compliance with the applicable NAAQS and WAAQS, as predicted in the revised modeling analyses, would be a required condition in the ROD.

#### E2. Resources with reasonably foreseeable residual effects warranting compensatory mitigation

- Wildlife: Pronghorn Antelope and Mule Deer  
Wildlife habitat would be unavoidably reduced on both a short- to long-term basis as a result of the surface disturbance related to the construction of well sites and their associated facilities on

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public, state, and private lands within the CD-C project area. The quality and function of habitat would also be reduced due to intermediate- to long-term alterations in the vegetative composition of habitats and the continuing traffic and human presence associated with natural gas production activities. These impacts would be in addition to historical impacts from prior surface disturbance. Proposed and existing habitat alteration together would represent ten percent or more of the CD-C project area.

Due to the current “High” level of impact to pronghorn and mule deer Crucial Winter Range, any additive impacts would be “High” or “Extreme.” Therefore, the impacts analysis in the EIS on mule deer and pronghorn habitat indicates that valid existing rights may result in development that would exceed significance under Criterion 2 (management actions that result in substantial disruption or irreplaceable loss of vital and high-value habitats). These impacts warrant compensatory mitigation as they are likely to “inhibit achieving an applicable land use plan’s resource objectives.”

### Rawlins RMP resource objectives of concern

- Maintain, restore, or enhance wildlife habitat in coordination and consultation with other local, state, and federal agencies and consistent with other agency plans, policies, and agreements. A full range of mitigation options will be considered when developing mitigation for project-level activities for wildlife and Special Status Species habitats.
- Maintain, restore, or enhance habitat function in crucial winter range.

### Mitigation Standard

Consistent with valid existing rights and applicable law and to support achieving the objectives of the Rawlins RMP, for actions that tier to this EIS, the BLM will require and ensure mitigation that provides a **no net loss to pronghorn antelope and mule deer crucial winter range and migration corridors** as signified in the Rawlins RMP objectives, by avoiding, minimizing and compensating for unavoidable impacts from development of projects that tier to this EIS (BLM 2008).

- Special Status Species: Greater Sage-Grouse.  
The impacts analysis in this EIS indicates that valid existing rights may result in development occurring inside PHMA in areas that may exceed established disturbance thresholds and would result in residual impacts. These impacts would warrant compensatory mitigation as these they are likely to inhibit achieving the Wyoming RMP Amendment’s resource objectives.

### Wyoming RMP Amendment resource objectives of concern

- Maintain and enhance quality/suitable habitat to support the expansion of Sage-Grouse populations on federally-administered lands within the planning area.
- Manage Sage-Grouse seasonal habitats and maintain habitat connectivity to support population objectives set by the State of Wyoming in cooperation with the agencies.
- Protect PHMAs and GHMAs from anthropogenic disturbance that will reduce distribution or abundance of GRSG.

### Mitigation Standard

Consistent with valid existing rights and applicable law and to support achieving the objectives of the Wyoming RMP Amendment, for actions that tier to this EIS, the BLM will require and ensure mitigation that provides a **net conservation gain to Greater Sage-Grouse habitat within PHMA and a no net loss to Greater sage-grouse habitat in GHMA** by avoiding, minimizing, and compensating for unavoidable impacts from development.

## F. Compensatory Mitigation Measures and Defined Outcomes

The following is an evaluation and prioritization of necessary and effective compensatory mitigation measures for the resources that warrant compensatory mitigation (mule deer, pronghorn antelope, and Greater Sage-Grouse), including clearly-defined and measurable outcomes.

### F1. Mitigation Measures

- **Mule Deer and Pronghorn Antelope and Associated Habitats:**  
There are several projects that can be implemented to improve habitat and use for big game species which include, but are not limited to: (1) sagebrush fertilization projects which help offset direct and indirect habitat losses by increasing sagebrush production, enhancing available winter forage and potentially increasing palatability and nutrient quality for wintering big game (specifically mule deer) (BLM 2012, BLM 2008c); (2) implement chemical thinning treatments (tebuthiuron, or Spike™) to increase forage variety, quantity and quality and improve the big sagebrush and mountain shrub age-class structure; (3) establish conservation easements on public or private land in high-quality habitat; (4) implement fence modification projects; (5) implement prescribed fire treatments for big game species (e.g., spring and fall ranges should focus on herbaceous component to help does with fawning and winter ranges should focus more on shrubs and shrub productivity); (6) seeding after fires; (7) mechanical treatments such as crushing with an aerator and including seeding in the treatment; (8) chaining, disking and imprinting pipe harrowing and aerating; (9) mowing; (10) other vegetation treatments such as planting of shrubs and aspen; and (11) control of invasive weeds (BLM 2012).
- **Greater Sage-Grouse.**  
There are several projects that can be implemented to improve habitat and use for Greater Sage-Grouse which include, but are not limited to:
  1. **Fence Marking and Removal**  
Christiansen (2009) estimated a 70-percent reduction in fence collision mortalities of Sage-Grouse could be expected along marked sections of fence. Stevens (2011) similarly predicted that marking fences with vinyl reflectors (flight diverters) reduced collision rates by up to 74 percent. To eliminate the threat of collisions, fences could be removed or marked with flight diverters similar to those used in the Christiansen (2009), Wolfe (2009), and Stevens (2011) studies to increase fence visibility to greater Sage-Grouse. Fences should be removed where possible, in consultation with and with concurrence of the grazing permittee. Where removal is not possible, two flight diverters should be installed between each fence span (4 m post-to-post). Priority areas for fence removal and marking should be: Sections of fence known to cause Sage-Grouse collisions; fences within 2 km (1.2 mi) of leks (Braun 2006; Stevens 2012) or other high risk area; fences in areas with low slope and terrain ruggedness (Stevens 2012); and fence segments bounded by steel t-posts with spans greater than 4 m (Stevens 2012). Once fences have been removed or marked, local annual mortality due to fence collisions would be substantially reduced.
  2. **Sagebrush Restoration and Enhancement**  
Sagebrush restoration and enhancement creates new habitat for Sage-Grouse and can be used to create corridors between existing sagebrush patches to produce larger areas of contiguous habitat. Habitat for Sage-Grouse consists of a mosaic of plant communities dominated by sagebrush and a diverse grass and forb understory across the landscape (WGFD 2003). This mitigation measure increases the quality and quantity of habitat within the landscape, contributing to the long-term survival and success of the Greater Sage-Grouse.

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Sage-Grouse habitat would be restored by re-establishing sagebrush and understory grasses and forbs in disturbed areas (e.g., roads, unreclaimed and abandoned pipeline corridors, unreclaimed and abandoned well pads, burned areas, etc.). Treatment for mitigation credit is not planned for areas of Project disturbance, which will be restored as described in the plan of development, but in areas of high value and durability that is commensurate with the life of the impact of the authorized project. Sagebrush can be seeded, planted as seedlings, or transplanted (i.e., containerized stems). Because seeded sagebrush takes a long time to grow to a size that provides habitat for Sage-Grouse, planting containerized stems is the most economical option. Sagebrush restoration and enhancement projects should include understory (grass and forb) treatments. Where possible, projects will be placed strategically to decrease habitat fragmentation by connecting existing occupied habitats.

### 3. Juniper Removal

Fire suppression and other post-settlement conditions have allowed western juniper to spread into areas previously dominated by grasses, forbs, and shrubs. Miller et al. (2005) reports that many areas have experienced an estimated 10-fold increase in juniper over the last 130 years. The expansion of juniper and other conifer species reduces habitat for Sage-Grouse and other sagebrush obligate species that depend on large patches of sagebrush-dominated vegetation. Sagebrush cover decreases with juniper encroachment as the vegetation transitions into woodland.

Most juniper communities are still in a state of transition. Miller et al. (2005) characterized three stages of woodland succession: Phase I (early) – trees are present but shrubs and herbs are the dominant vegetation that influence ecological processes (hydrologic, nutrient, and energy cycles) on the site; Phase II (mid) – trees are co-dominant with shrubs and herbs and all three vegetation layers influence ecological processes on the site; Phase III (late) – trees are the dominant vegetation and the primary plant layer influencing ecological processes on the site. Sites in Phase I or II successional stages often retain a significant understory of sagebrush (i.e., grasses and forbs), so removal of Phase I or II can produce immediate habitat benefits for Sage-Grouse (NRCS 2010; USFWS recommendations).

Juniper/conifer removal projects used for mitigation should focus primarily on the early successive stages of conifer/juniper stands (i.e., Phase I or Phase II juniper) with no cheatgrass component. Removal of juniper/conifer should be done by mechanical means without the use of fire or chemicals: Phase I juniper/conifer should be treated by having a field crew walk from tree-to-tree, cutting them into pieces and scattering them on-site (lop and scatter).

Phase II juniper/conifer should be treated by using a masticator, a large mechanical device that goes from tree-to-tree and demolishes the tree with whirling blades; debris is then left on site (mastication). All juniper/conifer removal projects should include understory treatment, where needed, and vegetation monitoring until the understory vegetation is established.

### 4. Seeding of a Forb and Bunchgrass Understory

Bunchgrasses are recognized as an important component of Sage-Grouse nesting and brood-rearing habitats (Connelly et al. 2000; Crawford et al. 2004). The structure and abundance of bunchgrasses influence the quality of a sagebrush/bunchgrass community site for nesting Sage-Grouse. Tall, dense, residual grass in nesting habitat improves hatching success by providing cover for incubating females (Cagney et al. 2009). Herbaceous cover may provide scent, visual, and physical barriers to potential predators (DeLong et al. 1995, as cited in Connelly et al. 2000). In addition to providing cover from predators, forbs are an important food source for Sage-Grouse broods. Sage-Grouse nesting and brood-rearing habitat is



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improved by seeding native bunchgrasses and forbs into existing sagebrush stands or into adjacent disturbance, increasing nest and brood success.

### 5. Purchase of Conservation Easements

Conservation easements may be purchased and managed to remove the threats of specific land uses to Sage-Grouse. The purchase of easements can prevent future Sage-Grouse habitat destruction or degradation near urban areas or oil and gas development. With appropriate management, conservation easements can reduce fragmentation in species core areas and key habitats. Conservation easements purchased for mitigation will be used in a strategic way with focus on areas/locations of highest demonstrable need leading to a reduction in habitat fragmentation.

## F2. Debit Calculations

As the extent of the reasonably foreseeable residual effects from actions that tier to this EIS (e.g. APDs, right-of-way grants, Sundry Notices) is unknown at this time, the following provides a formula that would be used to calculate the magnitude of the residual effects and the compensatory mitigation obligation (i.e. debits). The formulas are a tool to help the BLM ensure that the mitigation standards for these resources are achieved and that the required compensation is commensurate with the impacts.

### Generic Debit Formula

In determining how many debits (i.e. an assessment of the magnitude of the residual impacts; the compensatory mitigation obligation) are assigned to a particular residual impact, the **area** of residual effects (e.g. acres of direct and indirect impacts) is considered the *base* compensatory mitigation obligation.

This base compensatory mitigation obligation is then adjusted with consideration to the **quality** of the resource being impacted (e.g. suitable or unsuitable habitat) and **spatial characteristics** of the resource at the impact site within its relevant landscapes (e.g. critical nesting habitat or scarcely utilized habitat). These adjustments to the base compensatory mitigation obligation are calculated with the following formula:

$$\{[a+a(y_1)+a(y_2)+a(y_3)+\dots]q\}x = \text{debits}$$

Where:

a = area (e.g. acres of direct and indirect impact)

*Direct impacts are represented by the footprint of the project. A sigmoidal decay curve (Weisstein, n.d.) (applying the curve based on the specifics of the proposed project piece and the resource being impacted) is used to determine indirect impacts from, and in addition to, the project footprint*

y = spatial characteristics (e.g. critical nesting habitat or scarcely utilized habitat)

*Relevant and important spatial characteristics of the resources within the resources' landscape are identified by scientists and the agencies responsible for managing those resources. The spatial characteristics are weighted based on the importance of these spatial characteristics and serve as multipliers.*

q = quality (e.g. suitable or unsuitable)

*The quality of resource is determined by scientists and the agencies responsible for managing those resources. The quality is weighted based on the importance of that resource and serves as a multiplier.*

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x = other

*For some resources, additional considerations are necessary.*

During future NEPA analysis for actions that tier to this EIS, the formula would be augmented to address timeliness, risk of compensatory mitigation failure, implementation and effectiveness monitoring, and administrative costs of the compensatory mitigation measure, as necessary.

### Applying the Generic Debit Formula to Mule Deer and Pronghorn Antelope with resource-specific adjustments

The following formula will be used to calculate debits for residual impacts to mule deer and pronghorn antelope:

$$\{[a(y_x d_x) + a(y_x d_x) + a(y_x d_x) + \dots]qt\} = \text{debits}$$

*Where:*

a = area (e.g. acres of direct and indirect impact)

Direct impacts are represented by the footprint of the project. A decay function is used to determine indirect effects.

y = spatial multipliers representing a range of important habitats (spatial characteristics) (WGFD 2010a)

y = 2 if High Use Migration Corridors

y = 3 if Stop Over Spots within High Use Migration Corridors

y = 3 if Crucial Winter Range

d<sup>a</sup> = current density of development for pronghorn antelope

Current density can be determined through GIS analysis of well location per square mile (thresholds below are described in WGFD's Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats) (WGFD 2010a).

d<sup>a</sup> = 2 if disturbance density over 1/640, but under 4/640 and/or under 3%

d<sup>a</sup> = 4 if disturbance density over 5/640, but under 16/640 and/or over 3%, but under 12%

d<sup>a</sup> = 8 if disturbance density over 16/640 and/or over 12%

d<sup>m</sup> = current density of development for mule deer

Current density can be determined through GIS analysis of well location per square mile (thresholds below are described in WGFD's Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats) (WGFD 2010a).

d<sup>m</sup> = 2 if disturbance density over 1/640, but under 2/640 and/or under 3%

d<sup>m</sup> = 4 if disturbance density over 2/640, but under 4/640 and/or over 3%, but under 9%

d<sup>m</sup> = 8 if disturbance density over 4/640 and/or over 9%,

q = quality (determination of general habitat condition)

q = 1 in suitable mule deer and/or pronghorn antelope habitat

q = 0.75 in unsuitable mule deer and/or pronghorn antelope habitat

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The full debit is assessed in suitable habitat and “discounted” if in unsuitable / disturbed locations.

t = temporal scale of the impact (replaces “x” in the generic formula)

t = 1 if the impact is temporary (< 1 year)

t = 2 if the impact is permanent

### Applying the Generic Debit Formula to Greater Sage-Grouse with resource-specific adjustments

The following formula will be used to calculate debits for residual impacts to Greater Sage-Grouse:

$$\{[a+a(y_x)+a(y_x)+a(y_x)+a(y_x)]q\}s = \text{debits}$$

*Where:*

a = area (e.g. acres of direct and indirect impact)

Direct impacts are represented by the footprint of the project. A decay function is used to determine indirect effects (applying the curve based on the specifics of the proposed project).

y = spatial multipliers representing a range of important habitats (spatial characteristics) (WGFD 2010a):

y<sub>1</sub> = 2 if in general habitat outside of PHMA (Core Areas)

y<sub>2</sub> = 4 if inside of PHMA (Core Areas)

Core Areas – areas identified as containing the concentration of Sage-Grouse populations in Wyoming (Holloran and Anderson 2005, Doherty 2008)

y<sub>3</sub> = 8 if inside of PHMA (Core Areas) and within 4 miles of a lek

4 miles surrounding a lek – the distance at which impacts to a single lek remain discernable (used as the distance for the DDCT analysis) (Holloran and Anderson 2005, Holloran et al. 2007)

y<sub>4</sub> = 16 if within PHMA (Core Areas), within 4 miles, and within 0.6 mile of a lek

0.6 miles surrounding a lek – the distance in which more than 90 percent of breeding season movements by male Grouse are found (Carr 1967, Wallestad and Schladweiler 1974, Rothenmaier 1979, Emmons 1980, Schoenberg 1982)

y<sub>5</sub> = 16 if outside of PHMA (Core Areas), but within 0.25 mile of a lek

0.25 miles surrounding a lek outside of PHMA (Core Areas)– half the distance in which more than 90 percent of breeding season movements by male Grouse are found (Carr 1967, Wallestad and Schladweiler 1974, Rothenmaier 1979, Emmons 1980, Schoenberg 1982)

q = quality (determination of general habitat condition).

q = 1 in suitable Greater Sage-Grouse habitat

q = 0.75 in unsuitable Greater Sage-Grouse habitat

The full debit is assessed in suitable habitat and “discounted” if in unsuitable / transitioning habitat or disturbed locations (Wyoming Executive Order 2011-5, Appendix I), based on LMF, DDCT, and other available data.

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s = surface (above ground or below ground infrastructure).

s = 1 for above ground infrastructure

s = 0.5 for below ground infrastructure

The full debit is assessed for surface and/or tall structures and a “discount” is provided for buried infrastructure.

### Greater Sage-Grouse example

- Project Description

The proposed project is a well pad, pipeline, power line, and road. The proposed well pad will have two wells, Well #1 and Well #2, and disturb approximately 1.5 acres. The two-track would be upgraded to access the well locations from the southeast. The access to the proposed well would upgrade an existing two-track and will directly disturb approximately 2.5 acres (outside of 0.6 mile of Plant lek). Power lines would be buried with the flow line using a spider drill, following an existing road, but will still disturb approximately 2 acres (0.29 acres within 0.6 mile of Plant lek and 1.7 acres outside of 0.6 mile of Plant lek). The development phase would have a timing limitation condition of approval to prevent construction during the nesting season. Construction on the proposed project is due to begin August 1, 2015 and be completed by November 30, 2015. The expected life of the wells is 30 years. A Density and Disturbance Calculation Tool (DDCT) analysis was completed and the proposed disturbance is located in a DDCT analysis area that is was already disturbed at approximately 15 percent and has an energy development density of greater than 6.5/640. This project further exceeds the 5 percent disturbance and greater than 1 energy location per 640 acres cap.

Residual impacts remain because the new project proposal is inside PHMA and the density of disturbance of an energy or mining facility would be over an average of one site per square mile (640 acres) within the DDCT. The calculation is applied to the energy facility (the well location).

- Calculation for well disturbance

Well disturbance: a = 1.5 acres

The well is within PHMA. Therefore,  $y_1 = 0$ ,  $y_5 = 0$ , and  $y_2 = 4$ .

The well is within PHMA and within 4 miles of a lek. Therefore,  $y_3 = 8$ .

The well is within PHMA, within 4 miles, but not within 0.6 mile of a lek. Therefore,  $y_4 = 0$ .

The well is within unsuitable (disturbed) habitat. Therefore,  $q = 0.75$ .

The well infrastructure is above ground. Therefore,  $s = 1$ .

$$\{[1.5(4)+1.5(8)]0.75\}1 = 13.5 \text{ debits}$$

Residual impacts remain because the project is inside PHMA and all suitable habitat disturbed will exceed 5 percent of suitable habitat within the DDCT area using the DDCT process. The calculation is applied to all components of the project, split out as proposed within each spatial characteristic.

- Calculation for access road impacts

There will be 2.5 directly impacted acres and 160.98 indirectly impacted acres, for a total of 163.48 acres impacted outside 0.6 mile of the lek. Therefore, a = 163.48

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The access road is within PHMA. Therefore,  $y_1 = 0$ ,  $y_5 = 0$ , and  $y_2 = 4$ .

The access road is within PHMA, within 4 miles of a lek. Therefore,  $y_3 = 8$ .

The access road is within unsuitable (disturbed) habitat. Therefore,  $q = 0.75$ .

The access road is above ground. Therefore,  $s = 1$ .

$\{[163.48(4)+163.48(8)]0.75\}1 = 1,471.32$  debits

- Calculation for pipeline / power line

There will be 1.7 directly impacted acres outside 0.6 mile of the lek. Therefore,  $a = 1.7$ .

The pipeline / power line is within PHMA. Therefore,  $y_1 = 0$ ,  $y_5 = 0$ , and  $y_2 = 4$

The pipeline / power line is within PHMA and within 4 miles of a lek. Therefore,  $y_3 = 8$ .

The pipeline / power line is within PHMA, within 4 miles, and 0.29 directly impacted acres inside 0.6 mile of the lek. Therefore, for this portion of the access road,  $a = 0.29$  and  $y_4 = 16$ .

The pipeline / power line is within unsuitable (disturbed) habitat. Therefore,  $q = 0.75$ .

The pipeline / power line is below ground. Therefore,  $s = 0.5$ .

$\{[1.7(4)+1.7(8)+0.29(16)]0.75\}0.5 = 18.78$  debits

- Total debits from the entire project as resubmitted: 1,517.1 debits

### F. Draft CD-C Compensatory Mitigation Measures and Sites List

A CD-C discussion group (as described in the CD-C EIS, Chapter 2, Section 2.2.6) would be formed that would respond to evolving energy issues; respond to cooperator, local government, or landowner concerns related to the CD-C project; and discuss opportunities for compensatory mitigation measures and sites. This group would consist of the BLM, CD-C cooperators (state agencies, local governments, and conservation districts), local landowners, and permittees. The group would participate in a yearly site visit of the project area. Ideas and information shared at these meetings could be used by the BLM to implement adaptive management, in accordance with the DOI Adaptive Management Guidelines (USDI 2009) if and when necessary, to improve management of the area and mitigate additional or new impacts to sensitive resources.

BP America Production Company (BP), one of the principal operators on the field, expressed the need for a structured mitigation framework to complement the EIS that could be used to avoid potential conflicts between development and onsite wildlife values and identify opportunities to balance onsite impacts with additional conservation options to offset these impacts. BP invited The Nature Conservancy (TNC) to design such a plan. TNC sought to design an offset framework where the offsets are ecologically equivalent to the impacts (Appendix G to the CD-C EIS). The BLM would encourage the continuation of this effort in order to help inform the siting of compensatory mitigation measures, in coordination with the CD-C discussion group.

The CD-C discussion group would need to create and add to/ refine a list of projects / mitigation mechanisms that could be implemented as compensatory mitigation measures for residual impacts to Greater Sage-Grouse, pronghorn antelope, and mule deer as a result of development of the CD-C field.

The CD-C discussion group should consider the following with respect to compensatory mitigation sites:

- Each compensatory mitigation site will need to be considered with respect to achieving the maximum benefit, toward the mitigation standard, to the resource impacted by the CD-C

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development and additionality, durability, landowner agreements, timeliness, risk, and administrative costs.

- Sites should be determined without preference to land ownership. If sited on BLM-managed lands, the BLM should consider other potential uses of that land that are compatible with the compensatory mitigation site. If sited on non-BLM-managed lands, there must be a formal and binding agreement with the willing land owner.
- To increase efficiency, one compensatory mitigation site can provide opportunities for compensatory mitigation measures that benefit multiple resources that have been impacted by a single land use activity. In some cases, a single compensatory mitigation measure can benefit multiple resources that have been impacted by a single land use activity.

The BLM considers appropriate any of the following compensatory mitigation mechanisms: mitigation banks, mitigation exchanges, mitigation funds, and authorized land user (proponent)-responsible compensatory mitigation measures.

The BLM must ensure that each compensatory mitigation mechanism, if used to meet a compensatory mitigation obligation required by the BLM, is held to equivalent and effective standards. Therefore, in order to be considered by the CD-C discussion group, at a minimum, each compensatory mitigation mechanism's sponsor must:

1. Establish and describe clearly-defined and measurable outcomes and performance standards for the compensatory mitigation measures, including the types and amounts of resources that will be restored, established, enhanced, and/or preserved, and describe how these outcomes will contribute to achieving established resources objectives and addressing landscape-scale needs.
2. Describe the factors considered during the site selection process, including how the sites will address landscape-scale needs.
3. Ensure and describe how the durability of the compensatory mitigation measures and sites will be maintained.
4. Assess and document the baseline conditions of the compensatory mitigation sites, with consideration to the conditions and trends of resources at all relevant scales.
5. Implement a robust monitoring program, which considers the conditions and trends of resources at all relevant scales, to assess the effectiveness of compensatory mitigation measures and identify any need for adaptive management to achieve the required mitigation outcomes.
6. Develop and implement a plan for compensatory mitigation measure(s) and site(s) that describes:
  - a. Specifications for implementing the compensatory mitigation measures.
  - b. The schedule and plan to maintain compensatory mitigation measures for the duration of the impacts.
  - c. The triggers for adapting management, if necessary to achieve the required outcomes of the compensatory mitigation measures.
  - d. The accounting, tracking and reporting of measures/funds/credits.
7. Obtain financial assurances, as appropriate, to guarantee the implementation and effectiveness of compensatory mitigation measures and cover administration, durability, monitoring and reporting.

Following analysis of compensatory mitigation in the NEPA analyses for actions that tier to this EIS, the BLM, in the decision document and land use authorization, will make the final determinations on the amount of compensatory mitigation, the types of compensatory mitigation measures selected, and the compensatory mitigation sites chosen.

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The BLM will need to verify that any credits provided by mitigation banks, exchanges, in-lieu fee fund programs, or proponent-responsible projects used to offset impacts from actions that tier to this EIS are appropriate to address those impacts and fulfill the outcomes required by the formula from **Section F**. The BLM will review crediting methodologies developed by the sponsors of the compensatory mitigation mechanisms and/or other experts to help make this determination.

### **G. Durability and Monitoring of Mitigation**

This section provides a description of actions necessary to achieve durability of, and to monitor, adapt (if necessary), and report on, mitigation.

The residual impacts that warrant compensatory mitigation are identified in **Section E** and appropriate compensatory mitigation measures and the formula to determine the amount of compensatory mitigation are identified in **Section F**. During future NEPA analysis for actions that tier to this EIS, additional consideration will be given to compensation to address timeliness, risk of compensatory mitigation failure, implementation and effectiveness monitoring, and administrative costs, as necessary.

The NEPA analysis, decision document, land use authorization (via stipulations, conditions of approval, and/or terms and conditions attached to authorizations or permits) for actions that tier to this EIS will clearly describe the compensatory mitigation obligations, as determined by following the framework provided by this EIS. These obligations will include the actual compensatory mitigation measures and sites and associated outcomes, as informed by this appendix and the recommendations of the CD-C discussion group. The obligations will also include a monitoring program, compatible with LMF, which considers the conditions and trends at all relevant scales, including the LMF data points used to determine baseline for each of the associated areas, to assess the effectiveness of the compensatory mitigation measure and to identify any need for adaptive management. Effectiveness monitoring reports would be generated by the responsible party, in coordination with the Rawlins Field Office and submitted to the CD-C discussion group for review.

The responsible party, requesting the land use authorization, will be required to acquire credits or fund mitigation measures that adequately achieve the compensatory mitigation obligation's outcomes identified in the land use authorization.

All compensatory mitigation measures and sites must be durable for the duration of the impact of the project, improve the baseline conditions of the impacted resources, be demonstrably new (additional) and would not have occurred without the compensatory mitigation measure.

For actions that tier to the EIS, the Authorized Officer will retain discretion to require additional mitigation measures, beyond those described in this EIS, as appropriate.

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## APPENDIX S—LANDSCAPE SCALE MITIGATION

### Glossary

For additional descriptions of terminology used in the CD-C EIS, please see Chapter 8 of the Final EIS.

**Additionality:** a compensatory mitigation measure that improves the baseline conditions of the impacted resource, and is demonstrably new and would not have occurred without the compensatory mitigation measure.

**Application for Permit to Drill (APD):** official request submitted by a lessee or operator to the BLM for permission to drill a well. The approved APD is a contract between the operator and the Federal Government and cannot be changed or modified unless authorized by the BLM.

**Baseline:** the pre-existing condition of a resource, at all relevant scales, which can be quantified by an appropriate attribute(s). During environmental reviews, the baseline is considered the affected environment that exists absent the project's implementation, and is used to compare predictions of the effects of the proposed action or a reasonable range of alternatives.

**Best management practices (BMPs):** state-of-the-art, efficient, appropriate, and practicable mitigation measures for avoiding, minimizing, rectifying, and reducing or eliminating impacts over time.

**Change agents:** an environmental phenomena or human activity that can alter or influence the future condition and/or trend of a resource. Some change agents (e.g., roads) are the result of direct human actions or influence; others (e.g., climate change, wildland fire, and invasive species) may involve natural phenomena or be partially or indirectly related to human activities.

**Commensurate:** compensatory mitigation measures that are logically related and proportional to a land use activity's reasonably foreseeable impacts.

**Compensation:** compensating for the impact by replacing or providing substitute resources or environments (40 CFR 1508.20(e)).

**Compensatory mitigation measure:** an action that results in the restoration, establishment, enhancement, and/or preservation of resources in order to offset a residual effect.

**Compensatory mitigation mechanism:** a type of an arrangement where resources are restored, established, enhanced, and/or preserved (i.e. accrual of credits) for the purpose of compensating for residual effects to resources from land use activities (i.e. accrual of debits), and includes mitigation banks, mitigation exchanges, mitigation funds (also known as in-lieu fee programs), and authorized land user-responsible compensatory mitigation measures.

**Conditions of approval (COA):** conditions or provisions (requirements) under which a site-specific surface disturbing or human presence activity (Application for Permit to Drill, sundry notice, right-of-way, etc.) is approved.

**Core Area:** Executive Order 2008-2, which was superseded by Executive Order 2010-4 and again by 2011-5, issued by the Governor of Wyoming, delineated a Core Area to protect populations of greater Sage-Grouse in the state. The Order also outlines restrictions on the density of future development and other human activities that limit impacts to greater Sage-Grouse populations.

**Crucial habitat:** any particular range or habitat component (often winter or winter/year-long range in Wyoming) that is the determining factor in a population's ability to maintain and reproduce itself at a certain level (theoretically at or above the Wyoming Game and Fish Department's population objective) over the long term.

**Crucial winter range:** the portion of the winter range to which a wildlife species is confined during periods of heaviest snow cover.

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**Disruptive Activities:** This term/phrase refers to those public land resource uses/activities that are likely to alter the behavior of, displace, or cause excessive stress to animal or human populations. This term/phrase does not apply to any physical disturbance of the features of the land surface. Examples of disruptive activities may include, among others: noise, human foot or vehicle traffic, or other human presence, regardless of the purpose of the activity. When administered as a land use restriction (e.g., No Disruptive Activities), or provision, this phrase prohibits or limits the physical presence of sound above ambient levels, lights, and the nearness of people and their activities. As a case in point, this restriction is often aimed at protecting wildlife during critical life stages, or during periods of severe winter weather conditions, although it could apply to any resource value on the public lands. Disruptive activities include both short- and long-term effects on species.

**Durability:** the maintenance of the effectiveness of a mitigation measure and/or a compensatory mitigation site, including resource, administrative, and financial considerations.

**Duration of the impact:** the time it takes to restore the resources impacted (including direct and indirect effects) by a land use activity, even if this time period extends beyond the expiration of the land use activity. The duration of some impacts may be perpetuity.

**Fugitive Dust:** airborne emissions of visible and nonvisible fine, dry particulate matter smaller than 100 micrometers (microns) that result from surface disturbance activities.

**Habitat function:** arrangement of habitat features and the capability of those features to sustain species, populations, and diversity of wildlife over time (WGFD 2010a).

**Invasive species:** A species that is not native (or is alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health (Executive Order 13112).

**Landscape:** a geographic area encompassing an interacting mosaic of ecosystems and human systems that is characterized by a set of common management concerns. The landscape is not defined by the size of the area, but rather by the interacting elements that are relevant and meaningful in a management context.

**Mitigation:** includes, avoiding the impact altogether by not taking a certain action or parts of an action; minimizing impacts by limiting the degree or magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and, compensating for the impact by replacing or providing substitute resources or environments (40 CFR 1508.20).

**Mitigation standard:** a component of a land use plan's resource objective that describes the extent to which mitigation will be applied (e.g. net gain, no net loss, net loss).

**Minimization:** minimizing impacts by limiting the degree or magnitude of the action and its implementation (40 CFR 1508.20(b)).

**Net gain:** when mitigation results in an improvement above baseline conditions.

**Net loss:** when the lack of mitigation results in a negative change to baseline conditions.

**No net loss:** when mitigation results in no negative change to baseline conditions (e.g. fully offset or balanced).

**Practicable:** available and capable of being done after taking into consideration existing technology, logistics, and cost in light of a mitigation measure's beneficial value and a land use activity's overall purpose, scope, and scale.

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**Rectification:** rectifying the impact by repairing, rehabilitating, or restoring the affected environment (40 CFR 1508.20[c]).

**Residual effects:** any adverse foreseeable effect that are expected to remain after consideration of the first four steps in the mitigation hierarchy; also referred to as unavoidable impacts. The implementation of mitigation measures (e.g. rectification) at some point in the distant future does not eliminate a residual effect that will exist until that mitigation measure's outcome is achieved.

**Significant Impact:** effects of sufficient context and intensity that an environmental impact statement is required. The CEQ regulations at 40 CFR 1508.27(b) include ten considerations for evaluating intensity.

**Special status species (SSS):** Includes proposed species, listed species, and candidate species under the ESA; state-listed species; and BLM State-Director-designated sensitive species (BLM Manual 6840—Special Status Species Policy).

**Surface-disturbing activities:** Any authorized action that disturbs vegetation and surface soil, increasing erosion potential above normal site conditions. This definition typically applies to mechanized or mechanical disturbance. However, intense or extensive use of hand or motorized hand tools may fall under this definition. Examples of surface-disturbing activities include construction of well pads and roads, pits and reservoirs, pipelines and power lines, mining, and vegetation treatments.

**Timeliness:** the lack of a time lag between the impact to the resources and the achievement of the outcomes of the associated mitigation measures.